

10/768,179

REMARKS

This request for reconsideration is being filed in response to the Office Action dated August 18, 2005. For the following reasons, this application should be considered in condition for allowance and the case passed to issue.

The indication of allowability of claims 13 and 19 if rewritten in independent form to include all of the limitations of the base claim and any intervening claims is gratefully acknowledged. However, in light of the remarks provided below, these claims have not been rewritten into independent form at this time.

Claims 9-12, 14-15, 16-18 and 20 were rejected under 35 USC §103(a) as being unpatentable over the background of invention (BOI) in view of Adkisson, et al. (hereafter "Adkisson"). This rejection is hereby traversed and reconsideration and withdrawal thereof are respectfully requested. The following is a comparison of the present invention with BOI and Adkisson references.

The present invention, as recited in claim 9, for example, describes a semiconductor device comprising a main die area containing functional circuitry, and a scribe line monitor area circumferentially surrounding the main die area. Stress relief elements are provided in the scribe line monitor area. Neither the BOI nor the Adkisson reference describes or makes obvious such a combination of features.

As conceded in the Office Action, the BOI does not teach stress relief elements in the scribe line monitor area. For teaching such stress relief elements in the scribe line monitor area, the Examiner again relies on Adkisson in the present Office Action. As pointed out in Applicant's previous reply, and as described in more detail below, it is respectfully submitted that the reliance upon Adkisson for the missing teaching is misplaced. It is correct that Adkisson relates to a fuse structure with thermal and crack-stop protection. However, it is not correct that Adkisson teaches a

10/768,179

stress relief element in a scribe line monitor area. The Office Action refers to Figures 1-5, column 4, lines 48-64 and column 6, lines 1-44. The Figures do not depict a scribe line monitor area. Neither of the cited sections in Adkisson relates to a scribe line monitor area that surrounds a main die area. For example, column 4, lines 48-64 are reproduced in their entirety below.

Since SiLK and most other low-k organic materials are poor thermal conductors, as alluded to above, a large source of heat, represented, in this case, by silicide fuse element 14, separated therefrom by only a thin oxide or other insulator layer 18 will enhance the temperature excursion in the insulator layer 18 and portions of the SiLK layer adjacent thereto. The programming of a fuse may thus raise the temperature of the SiLK material well above the temperature at which degradation of the material will take place. There will also be a substantial generation of shear and tensile forces during the temperature excursion due to a differential of coefficient of thermal expansion. Some persistent shear and tensile forces will be developed which cannot be relieved from dimensional changes of the SiLK incident to thermal degradation. SiLK films can delaminate under stress, and cracks can be developed and propagated which can pierce barrier layer 20.

As one can readily ascertain from reading this cited section, there is no description of a scribe line monitor area or any area which can reasonably be inferred as being a scribe line monitor area. Applicant respectfully requests that the language within this section supporting the

10/768,179

Examiner's assertion be pointed out with greater specificity, should the Examiner maintain his position. The other cited section, column 6, lines 1-44, is also reproduced in its entirety below.

...time, region 32 provides some relief of shear and tensile stresses whether transient or persistent and serves as a mechanical crack-stop at the M1 level preventing compromise of further layers by cracking. Further, when the device is in service, the remaining thermal shields and paths provide an efficient heat sink and thermal control for the device, as will be apparent from the following discussion of FIG. 3.

The cross-sectional view 3--3 of FIG. 3 is orthogonal to the section 2--2 of FIG. 2. Underlying layers are also illustrated as a shallow trench isolation (STI) structure 38 on which polysilicon 14 and silicide fuse 16 are formed over a buried (or back) oxide layer (BOX) 40 and underlying silicon substrate 42 as would be encountered in, for example, a SOI structure. In such a structure, the silicon substrate 42, sometimes referred to as a handling substrate due to the mechanical robustness it provides, is highly thermally conductive and can function as an efficient heat sink if a thermal path thereto is provided by, for example, polysilicon studs 44 which may be elongated perpendicular to the page of FIG. 3, as shown by dashed lines 46 in FIG. 4. Connections 26' and 36 may be elongated in the same manner to increase area and decrease thermal resistance. While for ease of

10/768,179

visualization, the spacing between connection 36 and the fuse element is illustrated as being relatively large, in the invention this spacing is preferably minimized. By providing a crack-stop layer close to the fuse, the chances of a crack penetrating barrier layer 20 is substantially reduced. In addition, providing this element 36 in proximity to the fuse element provides yet another thermal dissipation path, limiting the temperature excursion of the SiLK.

Depending on the ground rules of the technology, this would be implemented as a long bar adjacent to the fuse element with frequent connections (and hence low thermal resistance) contacts to the metal element embedded within the SiLK layer. Connection 26' is desired to be close enough to allow good thermal dissipation, while far enough away that cracks terminate in the layer containing merged connections 36; the least active structure near the fuse. This arrangement thus maintains thermal resistance as low as possible with a three-dimensional structure providing heat dissipation in all directions from the fuse element.

Again, this section fails to reveal any mention of a scribe line monitor area or surrounding area that circumferentially surrounds a main die area. There does not appear to be any such description of a scribe line monitor area or any area that can reasonably be inferred as being a scribe line area monitor discussed at column 6, lines 1-44 in the above section.

10/768,179

Adkisson therefore fails to disclose the formation of stress relief elements in a scribe line monitor area and the advantages attendant thereto as provided by the present invention. Even if combined with BOI, the hypothetical combination would not achieve the claimed elements of the present invention since Adkisson does not teach placing stress relief elements in the scribe line monitor area, and neither does BOI.

Furthermore, Adkisson fails to disclose the use of dummy vias to provide crack resistance. The structures 22 and 26 are described as merged connections 22 in the form of local interconnects and/or vias, while 26 is shown as a contact that provides a thermal path. None of these contacts or structures depicted or described is a dummy via, and there is no description in Adkisson of such a structure.

For at least the above-stated reasons, it is respectfully submitted that Adkisson fails to provide any of the deficiencies noted by the Examiner with respect to BOI. Therefore, the rejection of the claims under 35 USC §103 based on obviousness must be reconsidered and withdrawn and such action is courteously solicited.

In light of the amendments and remarks above, this application should be considered in condition for allowance and the case passed to issue. If there are any questions regarding this request for reconsideration or the application in general, a telephone call to the undersigned would be appreciated to expedite the prosecution of the application.

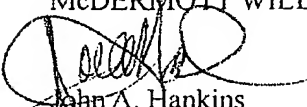
To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including

10/768,179

extension of time fees, to Deposit Account 502624 and please credit any excess fees to such deposit account.

Respectfully submitted,

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